

2022-08-16

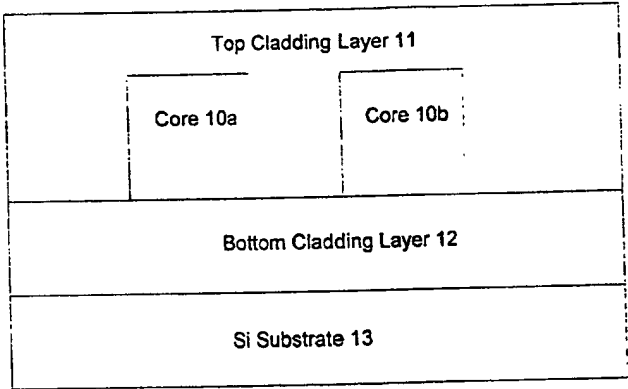


FIG. 1  
(Prior Art)

0947430-024700

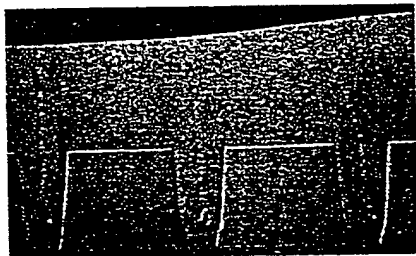


Fig 2 (a) BPSG 2um gap  
(print out)

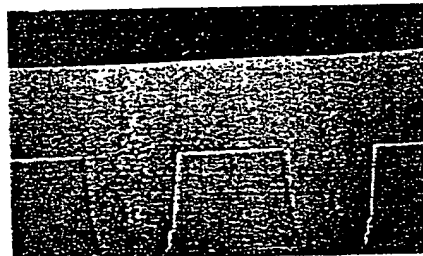


Fig 2 (b) BPSG 4um gap  
(print out)

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09947438-072704

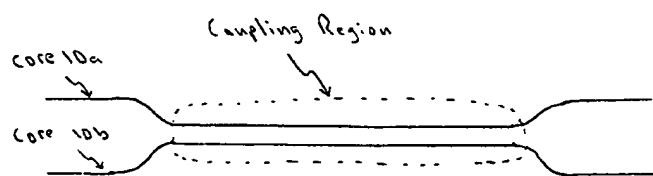


fig. 3

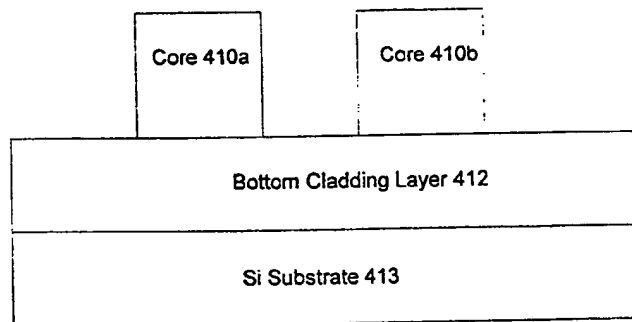


FIG. 4

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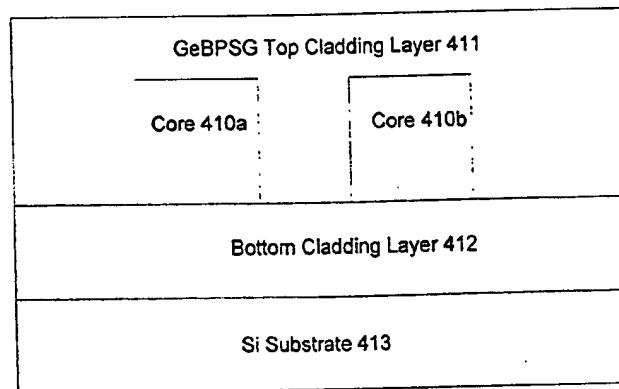
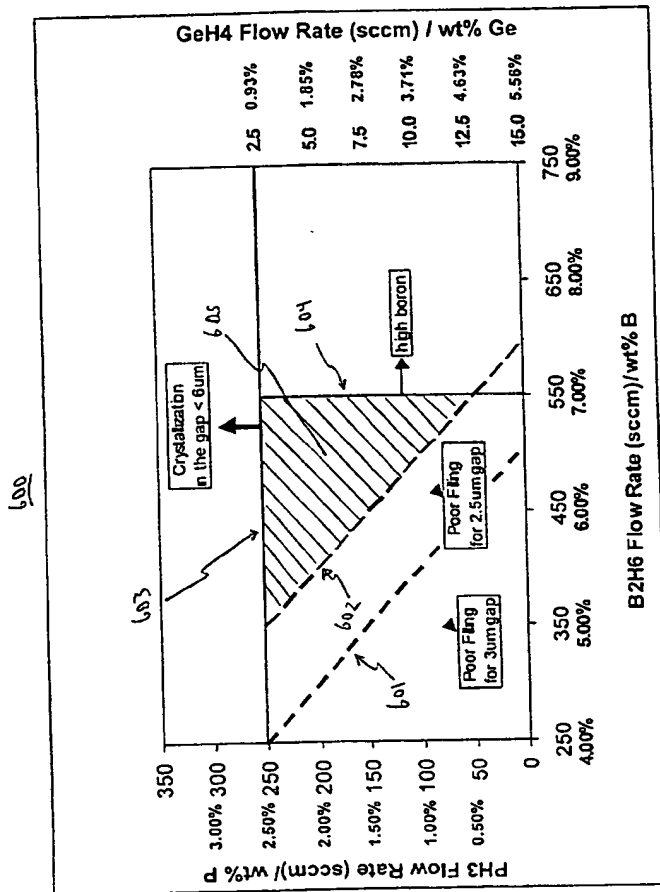


FIG. 5



GeBPSG Doping Window

FIG. 6

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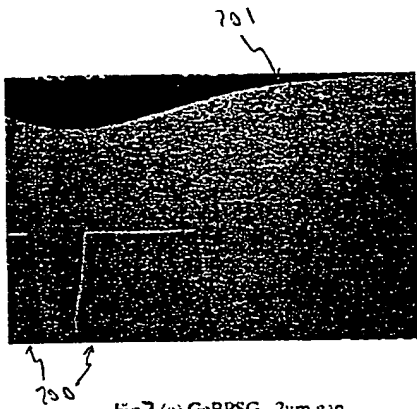


Fig 7 (a) GeBPSG 2um gap

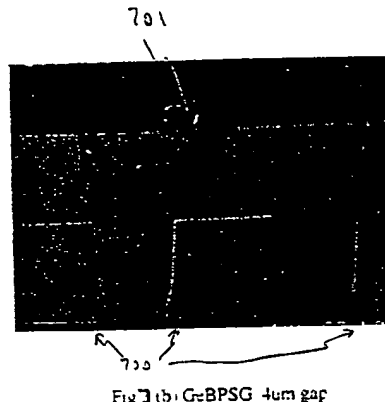
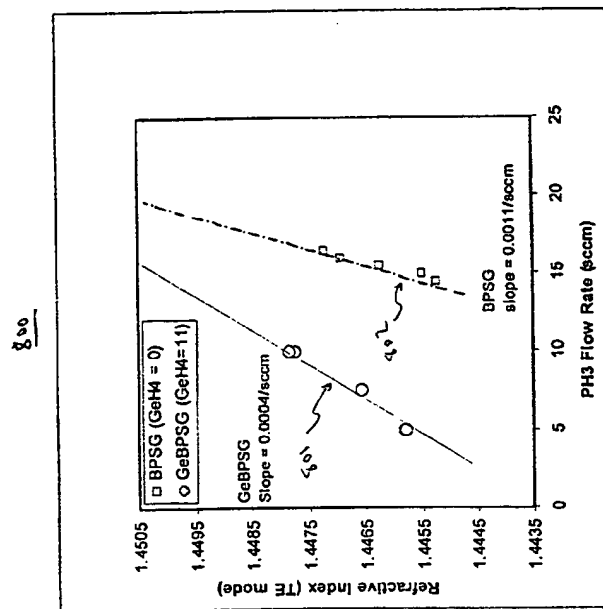


Fig 7 (b) GeBPSG 4um gap



Sensitivity of refractive index to PH<sub>3</sub> flow (GeBPSG vs. BPSG)

FIG. 8



TOP SECRET

900

Prepare a plurality of waveguide cores on a bottom cladding layer on a semiconductor substrate

901

Add doping gases (e.g. Ge dopant, P dopant, and B dopant) with SiH<sub>4</sub> and N<sub>2</sub>O in a PECVD system

902

Control the ratio of the doping gases to form a GeBPSG top cladding layer having precisely controlled ratios of P dopant, Ge dopant, and B dopant

903

Perform a thermal anneal process with a temperature in a range of 950°C to 1050°C on the top cladding layer

904

Fig. 9